PATENT ABSTRACTS OF JAPAN

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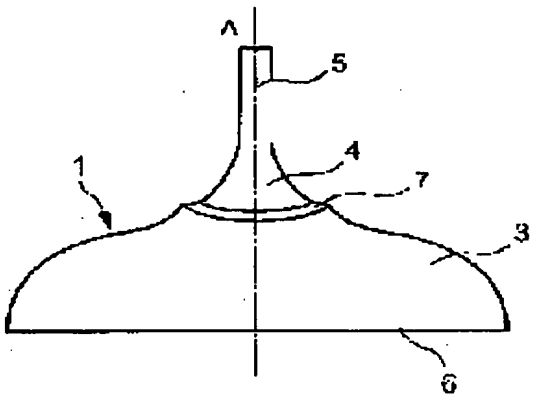
(54) GLASS FUNNEL FOR CATHODE RAY TUBE AND CATHODE RAY TUBE

(57)Abstract:

PROBLEM TO BE SOLVED: To reduce tensile vacuum stress caused in a yoke portion of a glass funnel.

SOLUTION: A seating portion 7 is provided near the yoke portion, ranging to the yoke portion 4 of a body 3 of the glass funnel 1, for inhibiting the tensile vacuum stress caused in this portion. Thus, the tensile vacuum stress of the yoke portion is reduced.



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* NOTICES *

CLAIMS

[Claim(s)]

[Claim 1] The glass funnel for cathode-ray tubes mostly characterized by the thing of the aforementioned body part near the yoke section of the aforementioned body part for which it has the plinth section in the diagonal direction at least in the glass funnel for cathode-ray tubes which consists of the neck section which is equipped with the opening edge of the abbreviation rectangle joined to the panel section, and stores an electron gun, the yoke section equipped with a deflecting coil, and the aforementioned opening edge and the body part which forms between the yoke sections.

[Claim 2] The aforementioned plinth section is a glass funnel for cathode-ray tubes according to claim 1 currently formed of the heavy-gage part with rapidly larger thickness than the thickness of the yoke section connected with a body part.

[Claim 3] The glass funnel for cathode-ray tubes according to claim 1 or 2 by which two or more neck sections and yoke sections are prepared in the aforementioned body part.

[Claim 4] The cathode-ray tube using the glass funnel for cathode-ray tubes according to claim 1, 2, or 3.

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention relates to the glass funnel for the cathode-ray tube mainly used for television broadcasting reception etc., and the cathode-ray tube using this.

[0002]

[Description of the Prior Art] The envelope is constituted when the cathode-ray tube used for television broadcasting reception etc. joins fundamentally the panel section of an abbreviation core box and the funnel-like funnel section (glass funnel) which have the face section of the shape of a rectangle which displays an image with solder glass etc. And the aforementioned funnel section is equipped with the opening edge of the abbreviation rectangle joined to the panel section, and consists of the yoke section equipped with a deflecting coil, the neck section which stores an electron gun, and a body part which connects the yoke section and an opening edge.

[0003] Thus, the cathode-ray tube using the glass funnel of the shape of the panel section of an abbreviation enclosed type and a funnel originates in unsymmetrical structure which is different from a spherical shell since the inside-and-outside pressure differential of one atmospheric pressure is added, and the field of big tensile stress (sign of +) as shown in drawing 6 exists comparatively broadly with compressive stress (sign of -). Here, the stress and the dotted line with which the solid line in drawing 6 met space show the distribution of the stress of a direction perpendicular to space, respectively, and the number in alignment with the stress distribution shows the stress value (unit MPa) in the position.

[0004] If a glass funnel is observed, tension vacuum stress will be generated the outside surface and near the yoke section the panel section so that drawing 6 may show. [near the sealing section] If the glass funnel does not have sufficient structural intensity greatly [this tension vacuum stress], the static-fatigue destruction by atmospheric pressure is produced, and it stops functioning as a glass funnel for cathode-ray tubes.

[0005] Since the probability that the field where the maximum Vmax of tension vacuum stress exists will serve as an origin is high, as for the aforementioned destruction, it is desirable to suppress this Vmax as much as possible. Although this Vmax will generally become small if the thickness of a glass funnel is increased, in order to suppress thickness in the rational range, the thickness and the configuration of a glass funnel are set that Vmax usually becomes the range of 6MPa-10MPa.

[0006] When performing such [conventionally] a design, as shown in drawing 7 , the profile of a contour line 8 is made into the shape of a rectangle of the opening edge of an abbreviation rectangle, and similarity near the sealing section with the panel section from the surrounding opening edge 6 of a tube axis A, and it is made to change smoothly near the yoke section, about the configuration of the body part of a glass funnel, so that it may become a configuration similar to the cone cone or square drill cone of the yoke section 4 although drawing 8 shows the major-axis cross section of this glass funnel -- the cross section of a minor axis and a diagonal shaft -- parenchyma -- it is the same The thickness of a body part 3 is dwindled toward the yoke section 4 of thin meat from the heavy-gage opening edge so that it may illustrate, and the thickness of the portion connected with the

yoke section is the same as the thickness of the yoke section.
[0007]
[Problem(s) to be Solved by the Invention] In order to suppress the capacity of a large-sized cathode-ray tube in recent years, the glass funnel is flattened by wide-angle-izing the deflection angle of an electron beam. In order that flattening of this glass funnel may increase said maximum tension vacuum stress, in the conventional glass funnel, it makes thickness increase fundamentally and is aiming at reduction of this stress.
[0008] However, since the thickness of the yoke section 4 has an upper limit on account of a deflecting coil, a limit is in heavy-gage-ization, and the configuration is also restrained by either of the shape of the shape of a cone, or a square drill. Furthermore, if flattening of a glass funnel progresses, since the aforementioned tension vacuum stress generated in the body part 3 near the yoke section will become still larger, in response to this influence, large tension vacuum stress arises also in the yoke section 4, and there is a possibility of stopping realizing as a cathode-ray tube.
[0009] The purpose of this invention is canceling the trouble of the conventional technology the measures of the tension vacuum stress generated in the yoke section by flattening of a glass funnel etc. being taken pressing need.
[0010]
[Means for Solving the Problem] By being made that the above-mentioned technical problem should be solved and improving the configuration of the body part of the portion connected with the yoke section of a glass funnel, this invention reduces the tension vacuum stress generated in the yoke section of a glass funnel, and attains increase and flattening of the intensity of a glass funnel.
[0011] Namely, the neck section which this invention is equipped with the opening edge of the abbreviation rectangle joined to the panel section, and stores an electron gun, In the glass funnel for cathode-ray tubes which consists of the yoke section equipped with a deflecting coil, and the aforementioned opening edge and the body part which forms between the yoke sections The cathode-ray tube using the glass funnel for cathode-ray tubes characterized by the thing of the aforementioned body part near the yoke section of the aforementioned body part for which it has the plinth section in the diagonal direction mostly at least, and this glass funnel is offered.
[0012]
[Embodiments of the Invention] The glass funnel of this invention is equipped with the opening edge of the abbreviation rectangle joined to the panel section as described above, it is the hollow vitreous humour which consists of the yoke section equipped with a deflecting coil, the neck section which stores an electron gun, and a body part which connects the yoke section and an opening edge, and an inside and superficies change from an abbreviation rectangle-like opening edge continuously toward the yoke section, and this body part is making the shape of a funnel to the whole. Even if funnel-like a gestalt and a profile may change with flattening of a glass funnel, the aspect ratio of an opening edge, etc., the shape of the basic form is maintained.
[0013] this invention makes it the requirements for composition to prepare the plinth section the portion to which it is connected with the yoke section near the yoke section of the body part of the aforementioned glass funnel (i.e., a body part), or near the. And this plinth section is mostly prepared in a diagonal direction, even if there are few body parts. Furthermore, this plinth section is characterized by being formed by enlarging rapidly thickness of the predetermined body part near the yoke section from the thickness of the yoke section.
[0014] Next, this invention is concretely explained according to a drawing. The front view of the glass funnel of this invention with desirable drawing 1 and drawing 2 are the plan, and drawing 3 shows the cross-section configuration of the major axis X of drawing 2 , a minor axis Y, and the diagonal shaft Z. In drawing, 3 has the abbreviation rectangle-like opening edge 6 by the body part, and it is the neck section which seals 4 in the yoke section and has sealed 5 at the edge of the aforementioned yoke section.
[0015] By the shape of a cone, the soffit is connected with a body part 3, and the aforementioned yoke section 4 is really formed. And while being equipped with a yoke coil (not shown) outside, since the inside makes the electron beam emitted from the electron gun stored in the neck section 5 scan smoothly, it is regulated by the configuration

and thickness of this yoke section 4 as usual. That is, although the thickness of the yoke section is decreasing slightly toward the neck section from the body part, it is thin meat generally.

[0016] Near the yoke section of the aforementioned body part 3, the plinth section 7 is annularly formed in the surroundings of the yoke section. In the cone-like yoke section, the plinth section is usually prepared in this way like this example succeeding the circumference of the yoke section. Thickness is increasing from the yoke section 4 in the portion connected with a body part more rapidly than the yoke section so that clearly from drawing 3 , and this plinth section is formed near the yoke section of a body part of this thick section obtained by desired width of face. In this case, since it is desirable for the inside configuration of a body part where the plinth section 7 is formed to be smooth from the relation of the orbit of an electron beam, as for the aforementioned thick section, it is desirable to form by usually changing an outside configuration.

[0017] Moreover, into how much the thickness and width of face of the plinth section are made determines in consideration of the thickness of the body part which mainly adjoins the size, the degree of flatness (deflecting angle of an electron beam), and the plinth section of a glass funnel etc. What is necessary is just to increase the thickness of the plinth section to obtain the depressor effect of large vacuum stress. Since the configuration of a body part 3 is sleeping near the yoke section relatively, although the plinth section of this portion cannot be easily visible in the shape of a plinth from the portions of an exterior and others in the cross-section configuration of a minor axis, it does not change to having a rapid heavy-gage part. In addition, you may change the thickness and width of face of the plinth section intentionally by the direction of a tube axis, or the surrounding direction of a tube axis A.

[0018] Drawing 4 shows other embodiments of this invention. In this example, the yoke section 4 has become pyramid-like (square shape yoke). In the case of a square shape yoke type glass funnel, there is an inclination which concentrates on the part where the tension vacuum stress generated near the yoke section of a body part is equivalent to the corner of a square shape yoke, and is generated strongly. Corresponding to this inclination, by this example, the plinth section 7 is faced and provided in the corner of a square shape yoke, as shown in drawing 4 .

[0019] Generally, since, as for the corner of a square shape yoke, only theta has shifted to the diagonal shaft Z of a body part 3, the plinth section 7 is not correctly in agreement with the diagonal shaft Z of a body part 3. However, since theta is not so large, if it carries out in general, the plinth section 7 is located in the direction of the diagonal shaft of a body part 3. The thing of a body part 3 for which such a gap is considered as preparing a diagonal shaft in a direction mostly is meant for the plinth section 7.

[0020] Furthermore, this invention is applicable to the body part 3 as shown in drawing 5 also to the glass funnel possessing the two yoke sections 4 and neck sections 5. This type of glass funnel is not used for the cathode-ray tube of a format which scans an electron ray in the field which divided the screen into two with two electron guns and deflecting coils, and although a picture can be reproduced without wide-angle-izing the deflecting angle of each yoke section, since flattening of the glass funnel is carried out substantially, it has the advantage which applies this invention.

[0021] In the glass funnel of this invention, the plinth section prepared in the body part near the yoke section mitigates or suppresses the tension vacuum stress produced into a yoke portion. That is, since the body part connected with the yoke section is thick rapidly by formation of the plinth section, it acts so that this plinth section may raise the rigidity of this portion of a body part, and the tension vacuum stress generated in the body part near the yoke section in the conventional glass funnel is suppressed by this rigidity. Since the yoke section is supported by the body part which prepared this plinth section, naturally the tension vacuum stress generated in this yoke section is also mitigated.

[0022]

[Example] An aspect ratio is for 86cm type cathode-ray tubes of 9:16, the glass funnel of this example has the square drill-like yoke section, and, for a deflection angle, the diameter of a neck outside is [170.00mm and the diameter of a diagonal shaft mould match of the height from 29.1mm and a funnel deviation center to an opening

edge] 913.8mm about 120 degrees.

[0023] Near the yoke section of the body part of this glass funnel, the about 20mm plinth section is annularly prepared in the surroundings of the yoke section with the size (width of face) of the direction of a flat surface like drawing 1 and drawing 2 . The glass thickness of the body part of this plinth section was 13.0mm by the formation of a plinth which has the thickness of about 5mm by ******.

[0024] The glass thickness (unit : mm) of the yoke section in the minor-axis cross section of this example and the example of comparison and the plinth section is shown in Table 1. The example of comparison is the glass funnel which does not have the plinth section, and, unlike this example, others are completely the same only at this point. In addition, others are also substantially the same although the minor-axis cross section was shown as a representative.

[0025] Although the maximum tensile stress of the yoke section has not put in practical use by about 12 MPa(s) in the example of comparison when the maximum tension vacuum stress generated in the yoke section was measured about the glass funnel of this example and the example of comparison, in this example, by preparing the plinth section, it is set to about 10 MPa(s) and came to be realized as a practical glass funnel. In addition, in the example of comparison, since there is no plinth section, the inside of a parenthesis shows the thickness in the plinth section equivalent portion of a body part.

[0026]

[Table 1]

	短軸断面のガラス肉厚	実施例	比較例
ヨーク部	ネックシール端	3．0	3．0
	リファレンスライン部	6．0	6．0
ボディ部	ヨーク部接続端	8．0	8．0
	台座最厚部	13．0	(8．0)
	台座部の終部	8．0	8．0

[0027]

[Effect of the Invention] In the glass funnel of this invention, since the heavy-gage plinth section is prepared near the yoke section of a body part, the tension vacuum stress generated into this portion can be suppressed. Since the yoke section is connected with this body part that prepared the plinth section and is supported, it can reduce the tension vacuum stress which this generates in the yoke section, and can obtain a glass funnel with more large intensity.

[0028] Also in the flattening glass funnel from which the intensity of the yoke section to tension vacuum stress poses a problem especially, since the tension vacuum stress generated in the body part near the yoke section by preparing the plinth section can be suppressed, thereby, the tension vacuum stress of the yoke section is mitigable to below predetermined.

[0029] Moreover, since the tension vacuum stress which flattening is generally carried out more and is generated in the yoke section increases and the glass funnel which prepares two or more yoke sections and neck sections in the one body faces, a desirable effect will be acquired if this invention is applied.

[Translation done.]

* NOTICES *

DESCRIPTION OF DRAWINGS

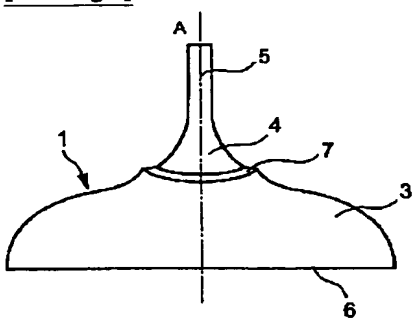
[Brief Description of the Drawings]
[Drawing 1] Front view of the glass funnel of the example of this invention.
[Drawing 2] The plan of drawing 1 .
[Drawing 3] The cross section of the major axis X of drawing 1 , a minor axis Y, and the diagonal shaft Z.
[Drawing 4] The plan of the glass funnel of other examples of this invention.
[Drawing 5] The plan of the glass funnel of other examples of this invention.
[Drawing 6] The vacuum stress-distribution view generated in a cathode-ray tube.
[Drawing 7] The topographic contour plot of the conventional glass funnel.
[Drawing 8] The cross section in the major axis of the conventional glass funnel.
[Description of Notations]
1: Glass funnel
2: Panel section
3: Body part
4: Yoke section
5: Neck section
6: Opening edge
7: Plinth section

[Translation done.]

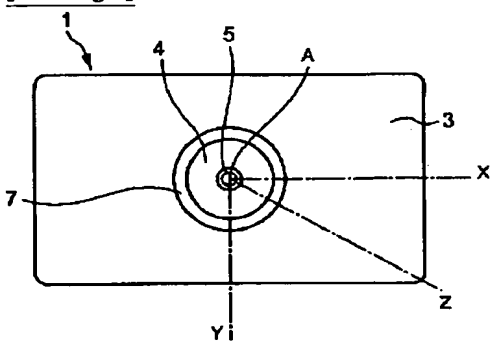
* NOTICES *

DRAWINGS

[Drawing 1]



[Drawing 2]



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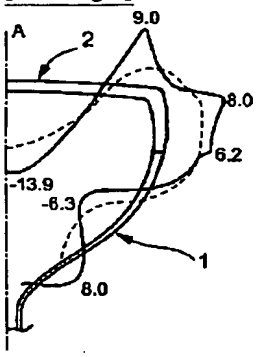
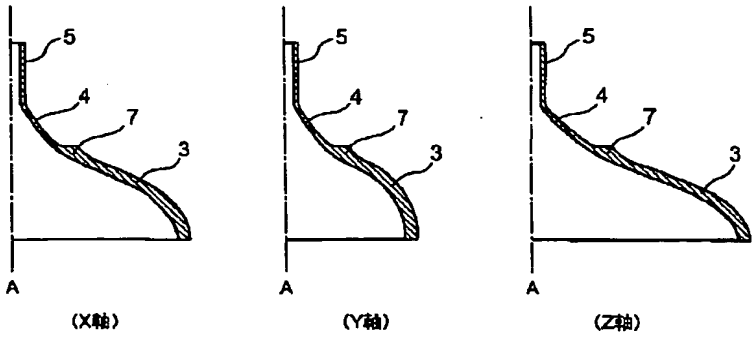


[Drawing 3]



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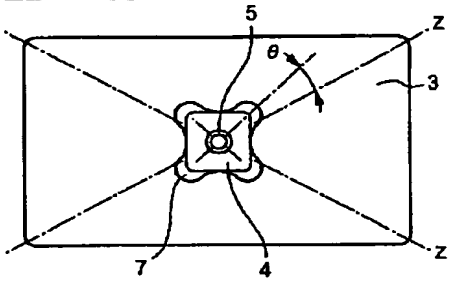

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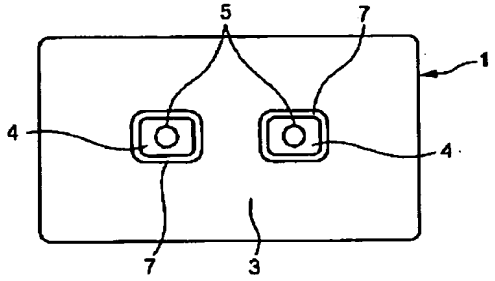
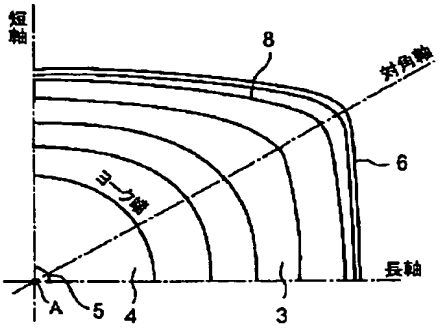
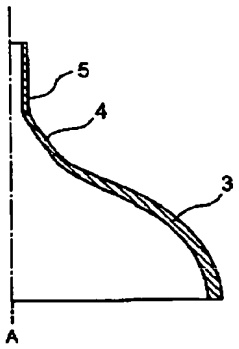


[Drawing 7]



[Drawing 8]



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